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UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
DIVISION OF AGRICULTURAL ENGINEERING

S. H. McCrory, Chief

MONTHLY NEWS LETTER

WASHINGTON, D. C., JULY 21, 1928.

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: THE COMPTROLLER GENERAL HAS RULED THAT THE :  
: ONLY EXPENSES FOR WHICH AN EMPLOYEE MAY PROPERLY BE :  
: REIMBURSED ARE THOSE ACTUAL TRAVELING EXPENSES IN- :  
: CURRED BY THE EMPLOYEE HIMSELF. UNDER THIS RULING :  
: AN EMPLOYEE SHOULD PAY A TEMPORARY ASSISTANT, SUCH :  
: AS A LABORER, ON FORM 1013D (SHORT FORM PAY ROLL) :  
: INSTEAD OF PAYING HIM IN CASH AND CLAIMING REIMBURSE- :  
: MENT. THE NECESSITY OF ANY NON-COMPLIANCE WITH THIS :  
: RULING MUST BE SATISFACTORILY EXPLAINED. SUCH NEC- :  
: ESSITY MIGHT AT TIMES ARISE FROM THE IMPOSSIBILITY :  
: OF HIRING LABOR TO BE PAID ON A VOUCHER. MINOR FIELD :  
: PURCHASES, INVOLVING ONLY SMALL AMOUNTS, MAY BE PAID :  
: FOR IN CASH. :  
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: ANOTHER RULING OF THE COMPTROLLER GENERAL IS :  
: TO THE EFFECT THAT WHERE A COMMISSIONED EMPLOYEE HAS :  
: AUTHORITY TO TRANSPORT AND BOARD ASSISTANTS, HE MAY :  
: NOT REIMBURSE THESE ASSISTANTS FOR TRANSPORTATION :  
: AND SUBSISTANCE EXPENSES INCURRED, AND THEN CLAIM :  
: REIMBURSEMENT HIMSELF, BUT EACH ASSISTANT MUST SUB- :  
: MIT HIS REIMBURSEMENT ACCOUNT IN HIS OWN NAME, IN :  
: THE USUAL WAY (FORM 1012), WHICH ACCOUNT MUST BE :  
: CERTIFIED TO IN THE PROPER PLACE, BY THE COMMISSIONED :  
: EMPLOYEE. CHECK WILL THEN BE MAILED TO THE ASSISTANT. :  
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: ENCLOSED WITH THIS MONTH'S NEWS LETTER IS A :  
: LIST OF OUR CURRENT PROJECTS AND SYMBOLS. PLEASE :  
: EXAMINE THE LIST CAREFULLY FOR ANY CHANGES THAT MAY :  
: HAVE BEEN MADE IN YOUR PROJECT SYMBOLS, AND INDICATE :  
: THE SAME ON ALL PAPERS COVERING EXPENDITURE OF FUNDS. :  
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ON JULY 6 MR. McCRORY LEFT WASHINGTON FOR AN EXTENSIVE WESTERN TRIP. HE PROCEEDED FIRST TO MEDICINE LAKE, S.D., WHERE WITH D. G. MILLER, REPRESENTATIVES OF THE STATE OF MINNESOTA, AND OTHERS INTERESTED, ONE OF THE PERIODICAL EXAMINATIONS WAS MADE OF CONCRETE TEST CYLINDERS INSTALLED BY MR. MILLER IN THE LAKE. FROM MEDICINE LAKE MR. McCRORY PROCEEDED TO NORTHERN MINNESOTA TO GO OVER WITH MR. E. V. WILLARD, STATE COMMISSIONER OF DRAINAGE AND WATERS, A PROPOSED PROJECT RELATING TO THE EFFECT OF DRAINAGE ON TIMBER GROWTH. MR. McCRORY THEN PROCEEDED TO THE FAR WEST VIA DENVER, FORT COLLINS, BOISE, CORVALLIS, AND BERKELEY. ON THIS TRIP HE WILL INSPECT THE PROGRESS OF THE MANY PROJECTS UNDER WAY IN THE WESTERN FIELD, RETURNING BY THE SOUTHERN ROUTE, AND ARRIVING IN WASHINGTON ABOUT AUGUST 15.

THE ANNUAL MEETING OF THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS HELD IN WASHINGTON JUNE 19-22 WAS FROM ALL REPORTS VERY SUCCESSFUL. THE REGISTRATION OF MEMBERS AMOUNTED TO 206. MANY MEMBERS BROUGHT THEIR WIVES AND CHILDREN. AN INTERESTING FEATURE IN CONNECTION WITH THE MEETING WAS A VISIT TO SECRETARY HOOVER AT THE DEPARTMENT OF COMMERCE, WHO ADDRESSED THE VISITORS BRIEFLY. THE MEMBERS OF THIS DIVISION TAKING PART IN THE MEETING PROGRAM WERE: C. E. RAMSER, F. O. BARTEL, AND DR. H. SCHILDKNECHT.

DR. H. SCHILDKNECHT ON JUNE 30 COMPLETED HIS TEMPORARY APPOINTMENT IN CONNECTION WITH THE PROJECT, "DRAINAGE INDEX OF SOILS," THAT IS BEING CARRIED ON UNDER THE DIRECTION OF F. E. STAEBNER. DR. SCHILDKNECHT, A FEW DAYS LATER, SAILED FOR SWITZERLAND, HIS HOME. IT IS FELT THAT THE DIVISION HAS PROFITED MUCH BY DR. SCHILDKNECHT'S APPOINTMENT AS HE HAD MADE IN SWITZERLAND EXTENSIVE STUDIES OF THE DRAINAGE PROPERTIES OF SOILS. BEFORE LEAVING DR. SCHILDKNECHT COMPLETED THE MANUSCRIPT FOR A BULLETIN ON "UNDERDRAINAGE AND THE SOIL."

R. A. NORTON IS AT PRESENT ENGAGED IN MAKING SURVEYS OF A NUMBER OF SEDIMENTATION BASINS IN ILLINOIS, IOWA, MISSOURI, AND NEBRASKA. THIS IS ONE OF THE PERIODICAL SURVEYS THAT WE HAVE BEEN MAKING FOR SEVERAL YEARS TO DETERMINE THE RATE OF FILLING OF THE RESERVOIRS WHICH ARE ESTABLISHED NEAR THE MOUTHS OF CERTAIN HILL STREAMS TO INTERCEPT THE SILT CARRIED BEFORE IT ENTERS THE MAIN DRAINAGE CHANNELS.

R. T. CHALLENGER, ASSOCIATE PROFESSOR OF MECHANICAL ENGINEERING OF MONTANA, ARRIVED JUNE 18 IN TOLEDO, WHERE HE HAS A TEMPORARY APPOINTMENT AS DESIGNER, IN CONNECTION WITH THE MANY MACHINERY ACTIVITIES TENDING TOWARD CORN BORER CONTROL.

MESSRS. ASHBY AND CHALLENGER GAVE VALUABLE ASSISTANCE IN SUPERVISING THE ERECTION OF THE BUREAU OF ENTOMOLOGY CORN BORER MOTH EMERGENCE CAGES ON THE DEVELOPMENT AND DEMONSTRATION FARM NEAR TOLEDO. THESE TWO CAGES, EACH COVERING AN ACRE, ARE REPORTED TO BE THE LARGEST MOTH CAGES EVER BUILT. THEY WERE DESIGNED BY T.A.H. MILLER OF THE WASHINGTON OFFICE.

MR. McCRORY SPENT JUNE 28 IN TOLEDO, WHERE HE HAD A CONFERENCE WITH MR. MERRILL AND OTHER TOLEDO AGRICULTURAL ENGINEERS.

R.B. GRAY SPENT TWO DAYS IN BOSTON RECENTLY, WHERE HE WAS IN CONFERENCE WITH MR. L. H. WORTHLEY, ADMINISTRATOR, CORN BORER CONTROL, AND MR. GUPTILL, MANUFACTURER OF THE HIGH-PRESSURE TRIPLEX PUMP USED IN COMBATING THE CORN BORER BY FIRE IN THE 1927 CLEAN-UP CAMPAIGN.







MESSRS. FRANK IRONS AND DAVID ISLER RETURNED TO TOLEDO JULY 14 FROM SOUTHERN TEXAS, WHERE THEY HAVE BEEN EXPERIMENTING WITH AND DEVELOPING, IN EARLY SWEET CORN, A STATIONARY SLIDING KNIFE AND SHIELD CORN BINDER ATTACHMENT FOR THE LOW CUTTING OF CORN AT GROUND LEVEL AS AID IN CORN BORER CONTROL. THE RESULTS OF THEIR WORK, WHICH WILL BE OF MUCH HELP TO THE CORN-BELT FARMER, ARE NOW BEING WRITTEN UP.

CARL ROHWER HAS SUBMITTED THE FOLLOWING BRIEF PRELIMINARY REPORT ON THE EFFECT OF ALTITUDE ON THE EVAPORATION FROM FREE WATER SURFACES;

OBSERVATIONS ON THE EFFECT OF ALTITUDE ON THE EVAPORATION FROM A FREE WATER SURFACE AT FT. COLLINS, COLO., AND AT OTHER POINTS IN THE UNITED STATES AT ELEVATIONS RANGING FROM 10,089 FEET ABOVE SEA LEVEL AT VICTOR, COLO., TO 68 FEET BELOW SEA LEVEL AT IMPERIAL, CALIF., INDICATE THAT, WHEN OTHER CONDITIONS REMAIN THE SAME THE EVAPORATION INCREASES WITH THE ALTITUDE. ONLY TENTATIVE CONCLUSIONS HAVE BEEN DRAWN AT THE PRESENT TIME, BECAUSE THE SERIES OF OBSERVATIONS HAS NOT BEEN COMPLETED AND THE FINAL ANALYSIS OF THE DATA ALREADY OBTAINED HAS NOT BEEN MADE.

SINCE WIND AND DIFFERENCE IN VAPOR PRESSURE ARE THE PRINCIPAL FACTORS THAT DETERMINE THE AMOUNT OF EVAPORATION PER UNIT AREA FROM A GIVEN TANK, IT IS OBVIOUS THAT THESE FACTORS MUST BE ELIMINATED BEFORE THE EFFECT OF ALTITUDE CAN BE MEASURED. FROM A LONG SERIES OF OBSERVATIONS MADE AT FT. COLLINS, COLO., UNDER CONTROLLED CONDITIONS IN THE LABORATORY AND CHECKED UNDER FIELD CONDITIONS, THE EFFECT OF THESE FACTORS WAS FOUND TO BE REPRESENTED BY THE FORMULA:

$$E = (0.118 W + 0.44) (E_s - E_d), \text{ IN WHICH}$$

$E$  = EVAPORATION IN INCHES PER 24 HOURS,

$W$  = GROUND WIND IN MILES PER HOUR, AND

$(E_s - E_d)$  = THE DIFFERENCE IN VAPOR PRESSURE IN INCHES OF MERCURY BETWEEN THE SATURATED VAPOR PRESSURE AT THE TEMPERATURE OF THE WATER SURFACE AND THE VAPOR PRESSURE OF THE DEWPOINT OF THE AIR.

SUBSTITUTING THE OBSERVED METEOROLOGICAL DATA TAKEN AT ANY POINT OF KNOWN ELEVATION IN THIS FORMULA GIVES THE EVAPORATION THAT WOULD HAVE OCCURRED AT FT. COLLINS UNDER THESE CONDITIONS AND THE DIFFERENCE BETWEEN THIS VALUE AND THE OBSERVED EVAPORATION REPRESENTS THE EFFECT OF THE DIFFERENCE IN ALTITUDE.

DR. W. L. POWERS, OREGON STATE AGRICULTURAL COLLEGE, M. R. LEWIS AND JAMES C. MARR COMPLETED AN INSPECTION OF ALKALI LAND RECLAMATION EXPERIMENTS BEING CONDUCTED AT COLDWELL, IDAHO, AND VALE, OREGON. MR. MARR HAS SUBMITTED THE FOLLOWING NOTES CONCERNING THE WORK:

ORIGINALLY BOTH OF THESE EXPERIMENTAL TRACTS REPRESENTED BLACK ALKALI SOIL OF AN EXTREMELY ADVERSE CHARACTER. NOT ONLY WAS THE CONCENTRATION OF ALKALI THE MAXIMUM FOUND IN SUCH SOILS, BUT THE MECHANICAL CONDITION OF THE SOIL WAS VERY POOR AND WAS OF A JELLY-LIKE CONSISTENCY IN THE LOWER LAYERS WHICH HINDERED THE FREE PERCOLATION OF WATER THROUGH IT. IT IS PROBABLE THAT THE SOIL OF THE CALDWELL STATION WAS SLIGHTLY MORE ADVERSE IN THESE CHARACTERISTICS THAN THAT AT VALE.

BENEFICIAL RESULTS HAVE BEEN PROCURED FROM APPLICATION OF SULPHUR, GYPSUM, AND MANURE ON THE VALE TRACT AFTER A PERIOD OF SEVEN YEARS. THE APPLICATION OF SULPHUR, SULPHURIC ACID, GYPSUM, CALCIUM CHLORIDE AND







MANURE AT THE CALDWELL TRACT HAS FAILED TO SHOW BENEFICIAL RESULTS IN CROP GROWTH AT THE END OF THREE YEARS WITH THE EXCEPTION OF MANURE PLACED AS A TOP DRESSING TO THE SOIL PRIOR TO SEEDING. FROM THE RESULTS OBTAINED AT VALE 2,000 TO 3,000 POUNDS OF SULPHUR, OR 5,000 POUNDS OF GYPSUM PLUS MANURE IN EITHER CASE APPEARS TO BE REQUIRED FOR PROCURING SATISFACTORY RESULTS. THE EXPENSE INVOLVED IS OBVIOUSLY PROHIBITIVE EXCEPTING IN CASES WHERE FOR VARIOUS REASONS LAND MIGHT JUSTIFY A VERY HIGH COST OF RECLAMATION.

FROM RESULTS PROCURED AT BOTH EXPERIMENT STATIONS PRACTICAL RECLAMATION OF BADLY ALKALINE LAND APPEARS TO CENTER ABOUT THE POSSIBILITY OF WASHING THE SALTS OUT OF THE SOILS BY COPIOUS IRRIGATION AND BY THE PLANTING AND CARE OF SPECIALLY ADAPTED CROPS. GOOD PASTURE HAS BEEN PROCURED BOTH AT VALE AND CALDWELL BY SEEDING UNCLEARED LAND TO PASTURE MIXTURES FOLLOWED BY COPIOUS IRRIGATION. THE PASTURE WAS FAIR THE FIRST YEAR AND IMPROVED EACH YEAR THEREAFTER. APPARENTLY LEVELING THE LAND RETARDS PROGRESS IN GETTING SATISFACTORY CROP FOR ABOUT THREE YEARS. IMMEDIATE RESULTS HAVE BEEN PROCURED AT CALDWELL BY COVERING LEVELED LAND WITH FROM 1 TO 2 INCHES OF WELL DECAYED MANURE, SEEDING TO WHITE BLOSSOM SWEET CLOVER, FOLLOWED BY COPIOUS IRRIGATION. IT HAS BEEN FOUND THAT ZAWADKE'S ALKALI GRASS AND STRAWBERRY CLOVER, BOTH OF WHICH AFFORD GOOD PASTURE, WILL GROW ON LAND HAVING A REACTION OF 10.4 PH. THIS REPRESENTS AN EXTREMELY ALKALINE CONDITION ABOVE THAT WHICH CAN BE ENDURED BY MOST OTHER CROPS, CONSEQUENTLY IT APPEARS THAT THESE CROPS MAY PROVE TO BE QUITE VALUABLE IN CONNECTION WITH ALKALI LAND RECLAMATION. ZAWADKE'S ALKALI GRASS HAS BEEN PLANTED AND IS DOING WELL AT BOTH CALDWELL AND VALE, WHILE A SMALL PATCH OF STRAWBERRY CLOVER HAS BEEN PLANTED AT VALE.

FRED C. SCODEY HAS SUBMITTED THE MANUSCRIPT FOR A BULLETIN ON "THE FLOW OF WATER IN RIVETED STEEL AND ANALOGOUS PIPES." AS IMPLIED, THE STUDY WAS BASED PRINCIPALLY ON EXPERIMENTAL DATA ON FULL RIVETED PIPES OF SHEET AND PLATE METAL. THE "ANALOGOUS PIPES" INCLUDE SHEET AND PLATE CONSTRUCTION THAT HAVE BEEN DEVELOPED DURING THE PAST TWO DECADES AS IMPROVEMENTS ON THE RIVETED PIPES - LARGELY IN THE MATTER OF CARRYING CAPACITY. THE STUDY WAS BASED ON ABOUT 1100 OBSERVATIONS ON PIPES FROM 4-INCH TO 168-INCH SIZES. A FORMULA WAS DEVELOPED THAT SATISFIES THE EMPIRICAL DATA AND ALSO THE LAW OF SIMILARITY OF FLUID FLOW AS FIRST SUGGESTED BY REYNOLDS IN 1883. LIKEWISE THERE WERE AVAILABLE SUFFICIENT DATA TO DEVELOP A TENTATIVE LAW FOR THE DETERIORATION IN CAPACITY WITH THE PASSAGE OF TIME.

M. C. BETTS HAS BEEN ENGAGED FOR THE PAST MONTH OR MORE IN THE PREPARATION OF PLANS FOR SEVERAL BUILDINGS TO BE ERECTED BY THE DEPARTMENT AT BOTH THE ARLINGTON AND BELTSVILLE EXPERIMENT FARMS.

A COOPERATIVE PROJECT HAS BEEN APPROVED COVERING THE INVESTIGATION OF DAIRY BARNs IN SOUTHEASTERN PENNSYLVANIA, WITH A VIEW TO IMPROVING THE TYPES OF BARNs IN USE AND MAKING THEM MORE SUITABLE FOR THE PRODUCTION OF HIGH-GRADE MILK. THE WORK WILL BE UNDER THE DIRECTION OF M. C. BETTS AND M.A.R. KELLEY IN DIRECT CHARGE.

J. T. BOWEN RECENTLY MADE TESTS ON A NUMBER OF PUMPING PLANTS IN THE VICINITY OF STUTTGART, ARK., USED FOR THE IRRIGATION OF RICE. THERE HAS BEEN A MARKED LOWERING OF THE WATER TABLE IN THAT REGION IN RECENT YEARS DUE TO THE LARGE NUMBER OF PUMPING PLANTS INSTALLED, RESULTING IN AN INCREASE IN THE COST OF PUMPING AND CONSEQUENTLY IN A DEMAND FOR MORE EFFICIENT PUMPING EQUIPMENT.



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